Three-dimensional graphical method for shear strain analysis

Taher, S.E.-D., Almusallam, A.A.

Journal of Strain Analysis for Engineering Design 29 (4), pp. 263-266, 1994

Abstract: The efficiency of graphical methods for strain analysis depends merely on its simplicity and accuracy. For most strain definitions, the Mohr circle has proved to be the most powerful graphical technique. Unfortunately, its three-dimensional form has limitations concerning the determination of the shearing strain components on a general oblique plane. In this paper, the various deformation quantifiers and the existing extensions to Mohr's method which account for its drawbacks are briefly reviewed. A novel proposal to be appended to Mohr's original construction, allowing its complete generality, is given. It has the form of a simplified complementary triangular construction. A mathematical formulation of the suggested graphical techniques on the basis of Cauchy's formula and vector analysis is carried out.